

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
29 September 2005 (29.09.2005)

PCT

(10) International Publication Number  
**WO 2005/090942 A1**

(51) International Patent Classification<sup>7</sup>: **G01N 3/00**

(21) International Application Number:  
PCT/AU2005/000249

(22) International Filing Date: 25 February 2005 (25.02.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
2004901537 23 March 2004 (23.03.2004) AU

(71) Applicant (for all designated States except US): **BENTHIC GEOTECH PTY LTD** [AU/AU]; 14 Vallance Street, St. Marys, NSW 2760 (AU).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KELLEHER, Patrick, Joseph** [AU/AU]; 'Mungala', Coolac, NSW 2727 (AU). **PAYOR, Stephen, David** [AU/AU]; 11 Horton

Street, Yagoona, NSW 2199 (AU). **SHIELS, James, Austin** [AU/AU]; 7 Bangalay Place, Leonay, NSW 2750 (AU).

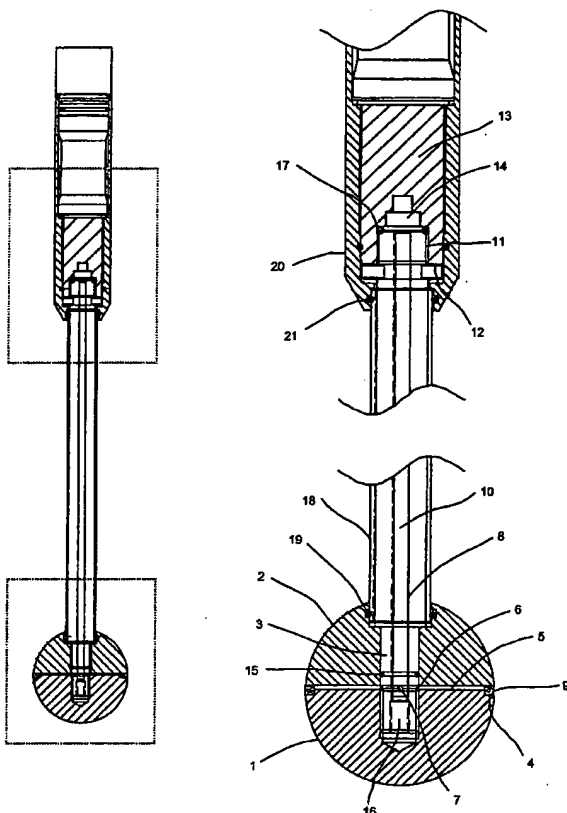
(74) Agents: **CARTER, Chris, John** et al.; Davies Collison Cave, Level 10, 10 Barrack Street, Sydney, NSW 2000 (AU).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH,

[Continued on next page]

(54) Title: **IMPROVED BALL PENETROMETER FOR SOFT SOILS TESTING**



(57) Abstract: A ball penetrometer probe for in situ measurement of soft soil properties, particularly in the seabed, comprises a spherical body and slender shaft assembly, and either individually or in combination, an anti-friction sleeve enclosing the shaft and/or a peripheral porous ring on the spherical body with connecting internal passages through the shaft assembly, the shaft being adapted to attach to an electronic transducer module. The ball penetrometer is deployed to penetrate the soil bed, to continuously measure the soil bearing forces resisting penetration and withdrawal of the ball, to optionally measure the pore water pressure of the soil in contact with the ball and to transmit the measurement data from the probe to a remote operating station, either by wireless means such as an acoustic transducer or via a wired electrical connection.



GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declaration under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY,

TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

**Published:**

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.